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Fukai

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(54) **IMAGE FORMING APPARATUS WITH A GUIDE MEMBER DISPOSED ALONG THE SHEET FEEDING PATH ON BOTH SIDES**

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G03G 15/00 (2006.01)

(52) **U.S. Cl.**
CPC ***G03G 15/6517*** (2013.01); ***G03G 15/652*** (2013.01)

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CPC G03G 15/6517; G03G 15/652; G03G 15/6523; G03G 2215/00455; B65H 23/0204; B65H 23/0208; B65H 23/0212; B65H 23/0216; B65H 23/032; B65H 23/0322; B65H 23/0324; B65H 23/035; B65H 23/038
See application file for complete search history.

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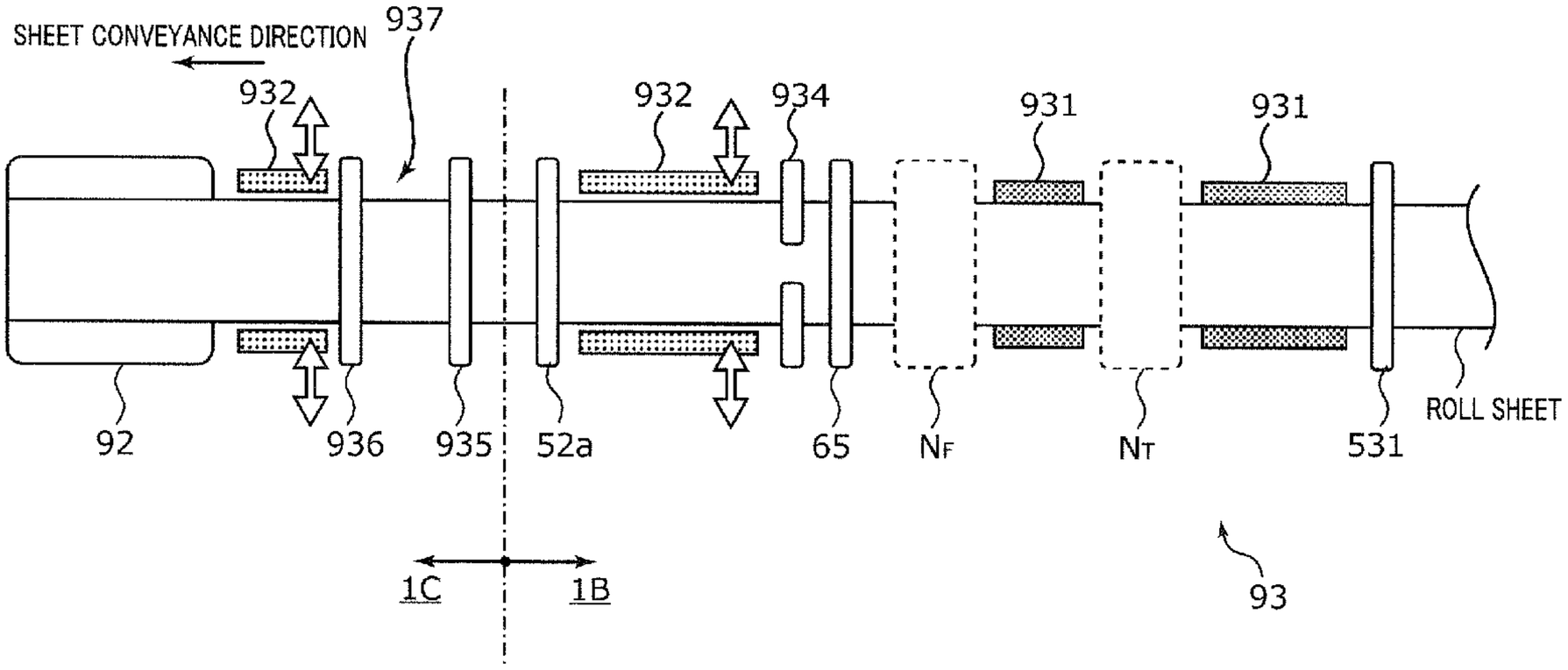
(57) **ABSTRACT**

An image forming apparatus includes: a sheet feeding section configured to feed a roll sheet; a sheet feeding path along which a roll sheet is conveyed; an image forming section configured to transfer a toner image to a roll sheet; a fixing section configured to fix the toner image by applying heat and pressure to a roll sheet on which the toner image is transferred at a fixing nip; a winding section configured to wind up a roll sheet; a guide member disposed along the sheet feeding path on both sides in a sheet width direction and on a downstream side of the fixing nip in a sheet conveyance direction; and a guide adjusting section configured to adjust a guide width of the guide member in accordance with an amount of shrinkage or an amount of expansion of a roll sheet passed through the fixing nip.

4 Claims, 6 Drawing Sheets



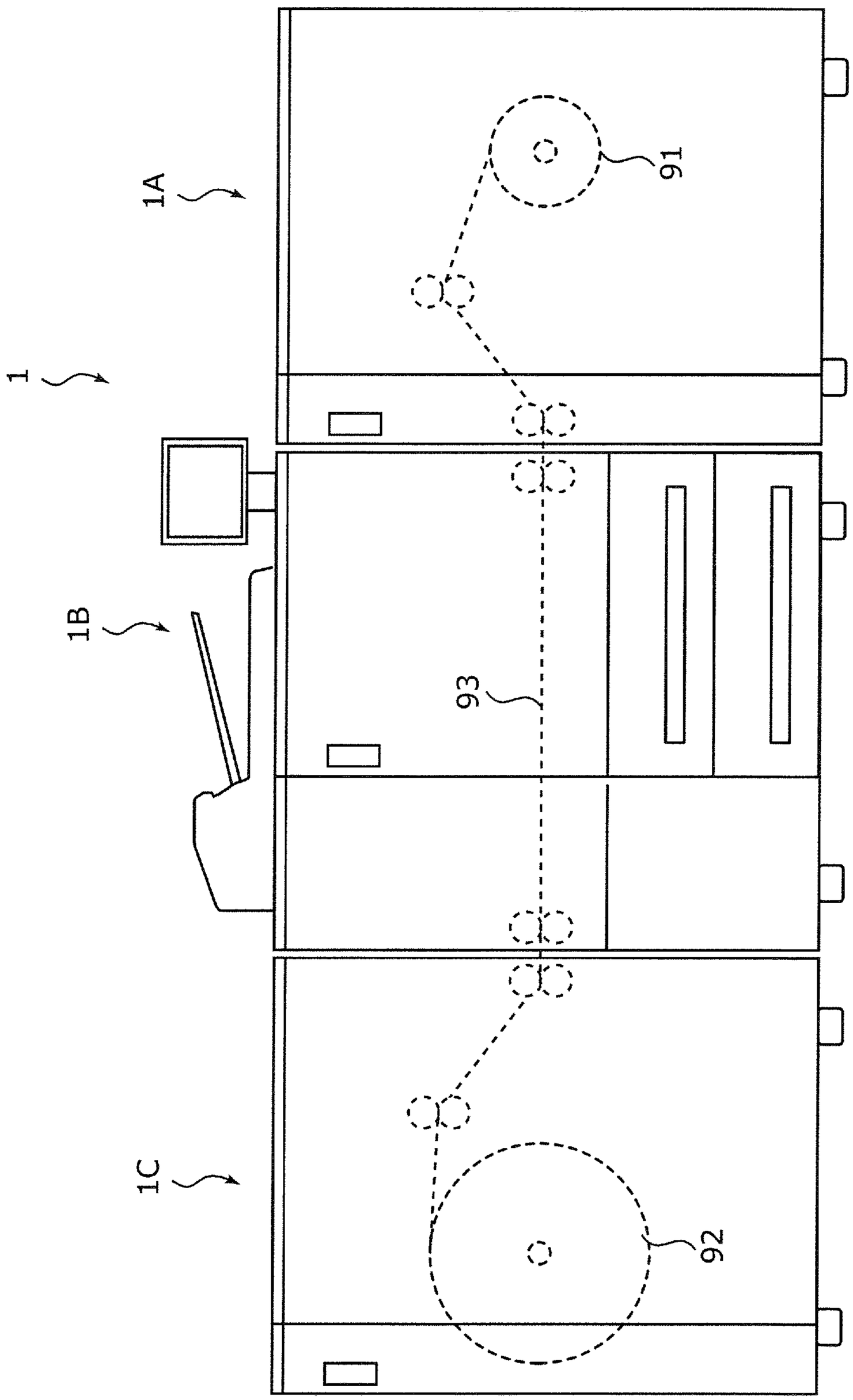


FIG. 1

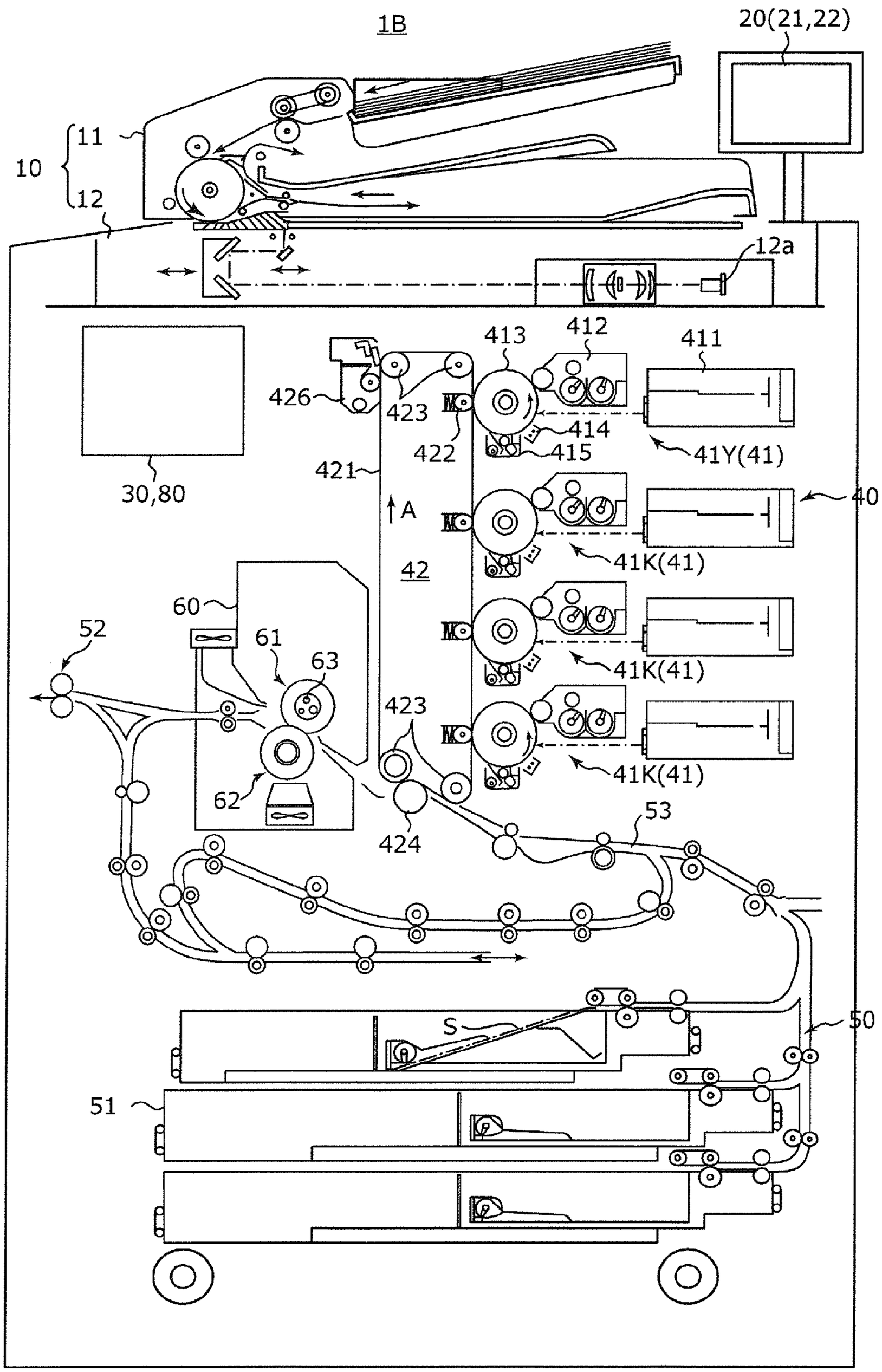

1B
20(21,22)
11
10
12
12a
412
413
412
411
426
423
414
422
415
41Y(41)
421
30,80
A
40
41K(41)
42
60
41K(41)
52
61
63
423
41K(41)
62
424
53
S
50
51

FIG. 2

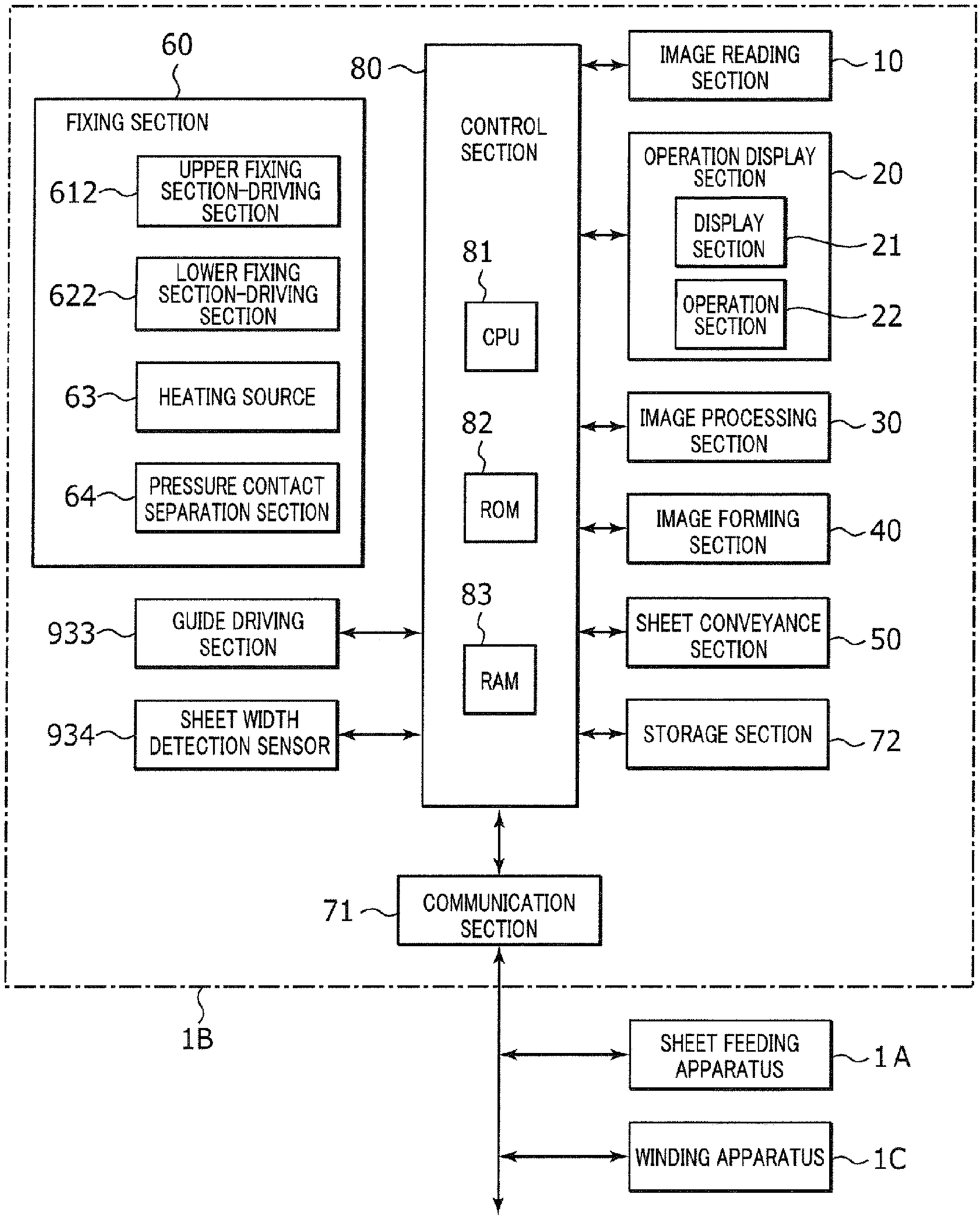

60
FIXING SECTION
612
UPPER FIXING SECTION-DRIVING SECTION
622
LOWER FIXING SECTION-DRIVING SECTION
63
HEATING SOURCE
64
PRESSURE CONTACT SEPARATION SECTION
80
CONTROL SECTION
81
CPU
82
ROM
83
RAM
IMAGE READING SECTION
10
OPERATION DISPLAY SECTION
20
DISPLAY SECTION
21
OPERATION SECTION
22
IMAGE PROCESSING SECTION
30
IMAGE FORMING SECTION
40
SHEET CONVEYANCE SECTION
50
STORAGE SECTION
72
933
GUIDE DRIVING SECTION
934
SHEET WIDTH DETECTION SENSOR
71
COMMUNICATION SECTION
1B
SHEET FEEDING APPARATUS
1A
WINDING APPARATUS
1C

FIG. 3

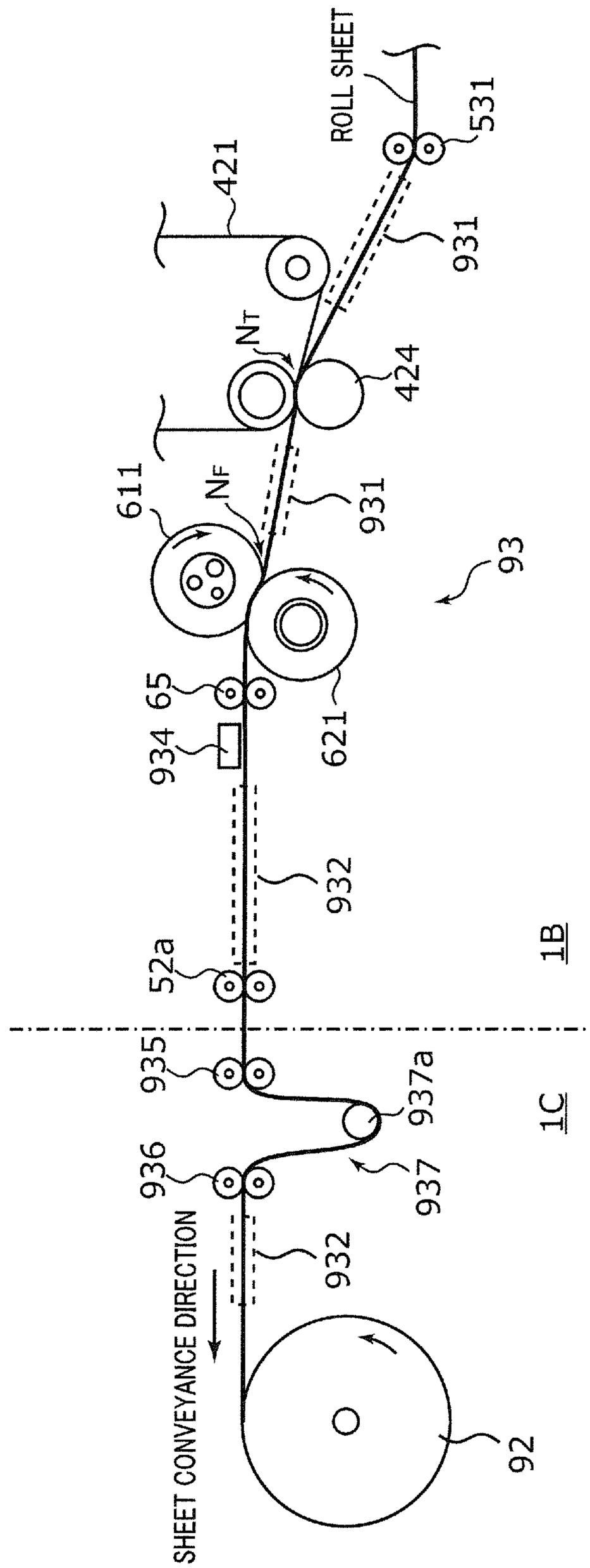

ROLL SHEET
531
421
931
NT
424
611
NF
931
93
934
65
621
932
52a
1B
935
937a
936
937
932
SHEET CONVEYANCE DIRECTION
92
1C

FIG. 4

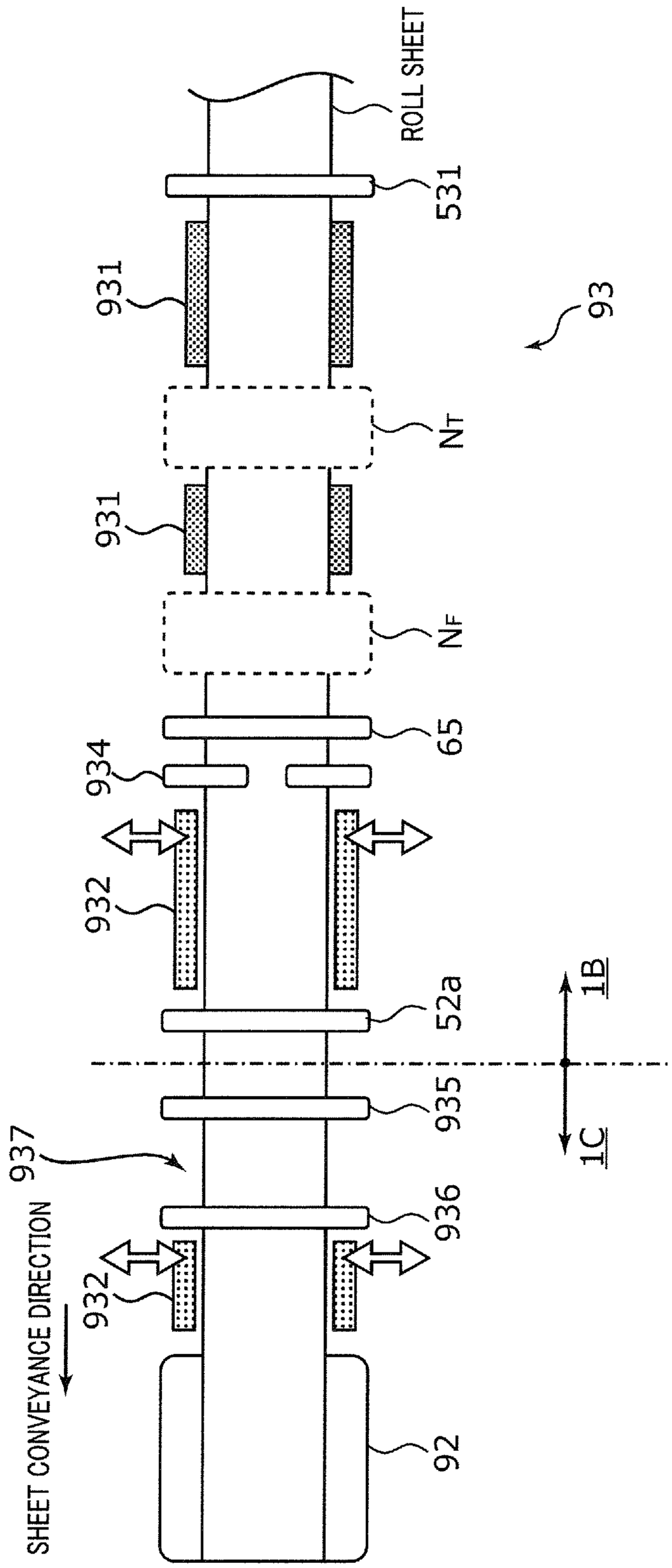

ROLL SHEET
531
931
93
N_T
931
N_F
934
65
932
52a
1B
1C
935
937
936
932
SHEET CONVEYANCE DIRECTION
92

FIG. 5

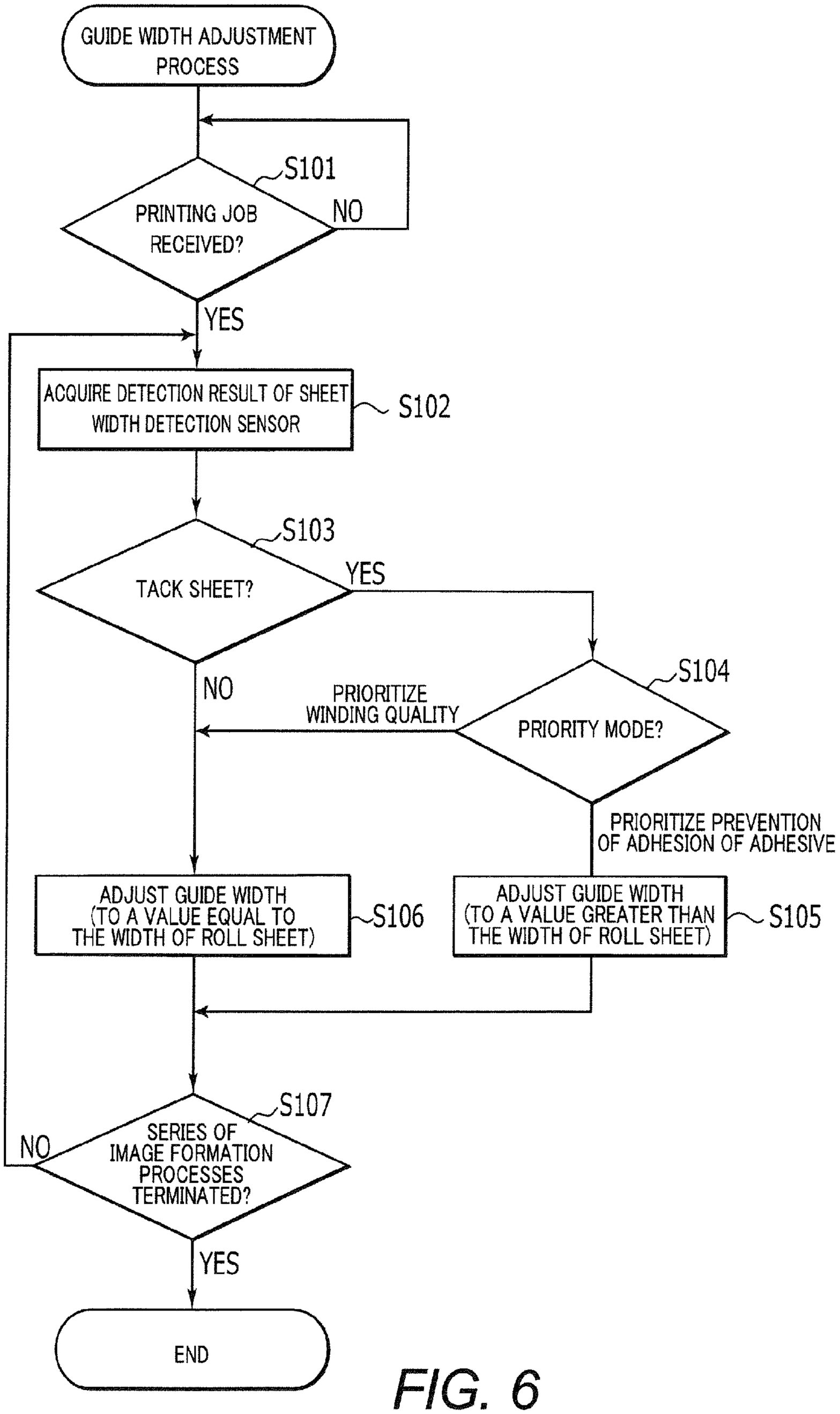

GUIDE WIDTH ADJUSTMENT PROCESS
S101
PRINTING JOB RECEIVED?
NO
YES
ACQUIRE DETECTION RESULT OF SHEET WIDTH DETECTION SENSOR
S102
S103
TACK SHEET?
YES
NO
S104
PRIORITIZE WINDING QUALITY
PRIORITY MODE?
PRIORITIZE PREVENTION OF ADHESION OF ADHESIVE
ADJUST GUIDE WIDTH (TO A VALUE EQUAL TO THE WIDTH OF ROLL SHEET)
S106
ADJUST GUIDE WIDTH (TO A VALUE GREATER THAN THE WIDTH OF ROLL SHEET)
S105
S107
SERIES OF IMAGE FORMATION PROCESSES TERMINATED?
NO
YES
END

FIG. 6

IMAGE FORMING APPARATUS WITH A GUIDE MEMBER DISPOSED ALONG THE SHEET FEEDING PATH ON BOTH SIDES

CROSS REFERENCE TO RELATED APPLICATIONS

The present invention claims priority under 35 U.S.C. §119 to Japanese Application No. 2014-050631, filed on Mar. 13, 2014, the entire content of which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to an electrophotographic image forming apparatus for forming an image on a roll sheet.

Description of Related Art

In general, an electrophotographic image forming apparatus (such as a printer, a copy machine, and a fax machine) is configured to irradiate (expose) a uniformly-charged photoconductor (for example, a photoconductor drum) with (to) laser light based on image data to form an electrostatic latent image on the surface of the photoconductor. The electrostatic latent image is then visualized by supplying toner from a developing device to the photoconductor on which the electrostatic latent image is formed, whereby a toner image is formed. Further, the toner image is directly or indirectly transferred to a sheet through an intermediate transfer belt, followed by heating and pressurization for fixing, whereby an image is formed on the sheet.

It is known that sheets are conveyed in a tilted state (so-called skew or meandering) in such an image forming apparatus due to a slight inclination of a conveyance roller shaft, a difference in a nip pressure (hereinafter referred to as "conveyance nip pressure") between a plurality of roller pairs in the sheet feeding path section, or other reasons. In particular, when the meandering occurs during image formation on a roll sheet, the sheet is continuously conveyed through a conveyance nip in a tilted state, and consequently, not only deviation of the image formation region, but also damages such as paper wrinkle may possibly be caused. Conventionally, the meandering of a roll sheet is prevented by pushing the guide member from the both sides of the roll sheet in the sheet width direction (the direction orthogonal to the sheet conveyance direction) (for example, PTL 1: Japanese Patent Application Laid-Open No. 2006-188352).

However, since a guide member is fixed at a position set in advance, the technique disclosed in PTL 1 has the following problem. For example, when a roll sheet shrinks during a fixing process in image formation on the roll sheet, a gap is formed between a guide member and a roll sheet whose positions are set in advance, and thus the meandering which occurs after the fixation is facilitated. In addition, for example, when a roll sheet expands during a fixation process, the width of the roll sheet becomes larger than the guide width of the guide member whose position is set in advance, and thus the roll sheet may be deformed or lateral end portions of the roll sheet may be damaged. As a result, winding quality is degraded and irregularity of ends of the wound roll sheet is caused, which may possibly cause problems in subsequent steps.

SUMMARY OF THE INVENTION

An object of the present invention is to provide an image forming apparatus which can prevent meandering and deformation of a roll sheet after fixation, and can perform winding of a roll sheet in an orderly fashion without causing irregularity of ends of the sheet.

To achieve at least one of the abovementioned objects, an image forming apparatus reflecting one aspect of the present invention includes: a sheet feeding section configured to feed a roll sheet; a sheet feeding path along which a roll sheet fed from the sheet feeding section is conveyed; an image forming section configured to transfer a toner image to a roll sheet conveyed along the sheet feeding path; a fixing section configured to fix the toner image by applying heat and pressure to a roll sheet on which the toner image is transferred at a fixing nip; a winding section configured to wind up a roll sheet on which the toner image is fixed; a guide member disposed along the sheet feeding path on both sides in a sheet width direction and on a downstream side of the fixing nip in a sheet conveyance direction; and a guide adjusting section configured to adjust a guide width of the guide member in accordance with an amount of shrinkage or an amount of expansion of a roll sheet passed through the fixing nip.

BRIEF DESCRIPTION OF DRAWINGS

The present invention will become more fully understood from the detailed description given hereinbelow and the appended drawings which are given by way of illustration only, and thus are not intended as a definition of the limits of the present invention, and wherein:

FIG. **1** illustrates an image forming apparatus according to an embodiment of the present invention;

FIG. **2** illustrates a general configuration of an image forming apparatus main body;

FIG. **3** illustrates a principal part of a control system of the image forming apparatus main body;

FIG. **4** is a side view illustrating a sheet feeding path of the image forming apparatus;

FIG. **5** is a plan view illustrating the sheet feeding path of the image forming apparatus; and

FIG. **6** is a flowchart illustrating an exemplary guide width adjustment process.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In the following, an embodiment of the present invention is described in detail with reference to the drawings.

FIG. **1** illustrates a configuration of image forming apparatus **1** according to the embodiment of the present invention.

Image forming apparatus **1** illustrated in FIG. **1** includes sheet feeding apparatus **1**A, image forming apparatus main body **1**B, and winding apparatus **1**C.

Sheet feeding apparatus **1**A includes roll sheet feeding section **91**, and feeds sheets under the instruction of image forming apparatus main body **1**B for example. The roll sheet fed from sheet feeding apparatus **1**A is conveyed along sheet feeding path **93**. Image forming apparatus main body **1**B forms an image on a roll sheet fed from sheet feeding apparatus **1**A. Winding device **1**C includes roll winding section **92**, and winds up an output roll sheet on which an image has been formed by image forming apparatus main body **1**B.

It is to be noted that sheet feeding path **93** includes a sheet feeding path in sheet feeding apparatus **1**A and a sheet feeding path in winding device **1**C.

FIG. **2** illustrates a general configuration of image forming apparatus main body **1**B. FIG. **3** illustrates a principal part of a control system of image forming apparatus main body **1**B.

Image forming apparatus main body **1**B illustrated in FIGS. **2** and **3** is a color image forming apparatus of an intermediate transfer system using electrophotographic process technology. A longitudinal tandem system is adopted for image forming apparatus main body **1**B. In the longitudinal tandem system, respective photoconductor drums **413** corresponding to the four colors of YMCK are placed in series in the travelling direction (vertical direction) of intermediate transfer belt **421**, and the toner images of the four colors are sequentially transferred to intermediate transfer belt **421** in one cycle.

That is, image forming apparatus main body **1**B transfers (primary-transfers) toner images of yellow (Y), magenta (M), cyan (C), and black (K) formed on photoconductor drums **413** to intermediate transfer belt **421**, and superimposes the toner images of the four colors on one another on intermediate transfer belt **421**. Then, image forming apparatus main body **1**B transfers (secondary-transfers) the resultant image to a sheet, to thereby form an image.

As illustrated in FIGS. **2** and **3**, image forming apparatus main body **1**B includes image reading section **10**, operation display section **20**, image processing section **30**, image forming section **40**, sheet conveyance section **50**, fixing section **60**, and control section **80**.

Control section **80** includes central processing unit (CPU) **81**, read only memory (ROM) **82**, random access memory (RAM) **83** and the like. CPU **81** reads a program suited to processing contents out of ROM **82** or storage section **72**, develops the program in RAM **83**, and integrally controls the operation of each block of image forming apparatus **1**B, sheet feeding apparatus **1**A and winding apparatus **1**C in cooperation with the developed program.

Communication section **71** has various interfaces such as network interface card (NIC), modulator-demodulator (MODEM), and universal serial bus (USB), for example. Storage section **72** is composed of, for example, a non-volatile semiconductor memory (so-called flash memory) or a hard disk drive.

Storage section **72** stores therein a look-up table which is referenced when the operation of each block is controlled, for example.

Control section **80** transmits and receives various data to and from an external apparatus (for example, a personal computer) connected to a communication network such as a local area network (LAN) or a wide area network (WAN), through communication section **71**. Control section **80** receives image data (input image data) of page description language (PDL) that has been sent from an external device, and controls the apparatus to form an image on a sheet on the basis of the data, for example. In addition, control section **80** transmits and receives various data to and from sheet feeding apparatus **1**A and winding apparatus **1**C, through communication section **71**.

Image reading section **10** includes auto document feeder (ADF) **11**, document image scanner (scanner) **12**, and the like.

Auto document feeder **11** causes a conveyance mechanism to feed documents placed on a document tray, and sends out the documents to document image scanner **12**. Auto document feeder **11** enables images (even both sides thereof) of a large number of documents placed on the document tray to be successively read at once.

Document image scanner **12** optically scans a document fed from auto document feeder **11** to its contact glass or a document placed on its contact glass, and images light reflected from the document on the light receiving surface of charge coupled device (CCD) sensor **12***a*, to thereby read the document image. Image reading section **10** generates input image data on the basis of a reading result provided by document image scanner **12**. Image processing section **30** performs predetermined image processing on the input image data.

Operation display section **20** includes, for example, a liquid crystal display (LCD) with a touch panel, and functions as display section **21** and operation section **22**. Display section **21** displays various operation screens, image conditions, operating statuses of functions, and the like in accordance with display control signals received from control section **80**. Operation section **22** includes various operation keys such as numeric keys and a start key, receives various input operations performed by a user, and outputs operation signals to control section **80**.

By operating operation display section **20**, the user can perform setting relating to the image formation such as document setting, image quality setting, multiplying factor setting, application setting, output setting, single-sided/duplex printing setting, and sheet setting.

Image processing section **30** includes a circuit that performs a digital image process suited to initial settings or user settings on the input image data, and the like. For example, image processing section **30** performs tone correction on the basis of tone correction data (tone correction table), under the control of control section **80**. Image processing section **30** also performs various correction processes such as color correction and shading correction as well as a compression process, on the input image data. Image forming section **40** is controlled on the basis of the image data that has been subjected to these processes.

Image forming section **40** includes: image forming units **41** for images of colored toners respectively containing a Y component, an M component, a C component, and a K component on the basis of the input image data; intermediate transfer unit **42**; and the like.

Image forming unit **41** includes image forming units **41**Y, **41**M, **41**C, and **41**K for the Y component, the M component, the C component, and the K component, respectively. For ease of illustration and description, common elements are denoted by the same reference signs. Only when elements need to be discriminated from one another, Y, M, C, or K is added to their reference signs. In FIG. **2**, reference signs are given to only the elements of image forming unit **41**Y for the Y component, and reference signs are omitted for the elements of other image forming units **41**M, **41**C, and **41**K.

Image forming unit **41** includes exposing device **411**, developing device **412**, photoconductor drum **413**, charging device **414**, drum cleaning device **415**, and the like.

Photoconductor drum **413** is, for example, a negative-charge-type organic photoconductor (OPC) formed by sequentially laminating an under coat layer (UCL), a charge generation layer (CGL), and a charge transport layer (CTL) on the circumferential surface of a conductive cylindrical body (aluminum-elementary tube) made of aluminum. The charge generation layer is made of an organic semiconductor in which a charge generating material (for example, phthalocyanine pigment) is dispersed in a resin binder (for example, polycarbonate), and generates a pair of positive charge and negative charge through light exposure by exposure device **411**. The charge transport layer is made of a layer in which a hole transport material (electron-donating

nitrogen compound) is dispersed in a resin binder (for example, polycarbonate resin), and transports the positive charge generated in the charge generation layer to the surface of the charge transport layer.

Charging device **414** is composed of a corona discharging generator such as a scorotron charging device and a corotron charging device, for example. Charging device **414** evenly negatively charges the surface of photoconductor drum **413** by corona discharge.

Exposing device **411** is composed of, for example, an LED print head including an LED array having a plurality of linearly laid out light-emitting diodes (LED), an LPH driving section (driver IC) for driving each LED, and an lens array that brings light radiated from the LED array into an image on photoconductor drum **413**, and the like. Each of the LEDs of LED array **1** corresponds to one dot of an image. Control section **80** controls the LPH driving section to cause a predetermined driving current to flow through the LED array, and thus designated LEDs emit light.

Exposure device **411** irradiates photoconductor drum **413** with light corresponding to the image of each color component. The positive charge generated in the charge generation layer of photoconductor drum **413** is transported to the surface of the charge transport layer, whereby the surface charge (negative charge) of photoconductor drum **413** is neutralized. Thus, an electrostatic latent image of each color component is formed on the surface of photoconductor drum **413** by the potential difference from its surroundings.

Developing device **412** stores developers of respective color components (for example, two-component developers composed of toner and magnetic carrier). Developing device **412** attaches the toners of respective color components to the surface of photoconductor drum **413**, and thus visualizes the electrostatic latent image to form a toner image. To be more specific, a developing bias voltage is applied to a developer bearing member (developing roller), and, by the potential difference between photoconductor drum **413** and the developer bearing member, the charged toner on the developer bearing member is moved and attached to a light-exposed part on the surface of photoconductor drum **413**.

Drum cleaning device **415** includes a drum cleaning blade that is brought into sliding contact with the surface of photoconductor drum **413**, and removes residual toner that remains on the surface of photoconductor drum **413** after the primary transfer.

Intermediate transfer unit **42** includes intermediate transfer belt **421**, primary transfer roller **422**, a plurality of support rollers **423**, secondary transfer roller **424**, belt cleaning device **426** and the like.

Intermediate transfer belt **421** is composed of an endless belt, and is stretched around the plurality of support rollers **423** in a loop form. At least one of the plurality of support rollers **423** is composed of a driving roller, and the others are each composed of a driven roller. Preferably, for example, support roller **423** disposed on the downstream side in the belt travelling direction relative to primary transfer support rollers **422** for K-component is a driving roller. When driving roller rotates, intermediate transfer belt **421** travels in arrow A direction at a constant speed.

Primary transfer rollers **422** are disposed on the inner periphery side of intermediate transfer belt **421** in such a manner as to face photoconductor drums **413** of respective color components. Primary transfer rollers **422** are brought into pressure contact with photoconductor drums **413** with intermediate transfer belt **421** therebetween, whereby a primary transfer nip for transferring a toner image from photoconductor drums **413** to intermediate transfer belt **421** is formed.

Secondary transfer roller **424** is disposed on the outer periphery side of intermediate transfer belt **421** in such a manner as to face one of support rollers **423**. Support roller **423** that is so disposed as to face intermediate transfer belt **421** is called "backup roller." Secondary transfer roller **424** is brought into pressure contact with the backup roller with intermediate transfer belt **421** therebetween, whereby a secondary transfer nip for transferring a toner image from intermediate transfer belt **421** to a sheet is formed.

When intermediate transfer belt **421** passes through the primary transfer nip, the toner images on photoconductor drums **413** are sequentially primary-transferred to intermediate transfer belt **421**. To be more specific, a primary transfer bias is applied to primary transfer rollers **422**, and an electric charge of the polarity opposite to the polarity of the toner is applied to the rear side (the side that makes contact with primary transfer rollers **422**) of intermediate transfer belt **421**, whereby the toner image is electrostatically transferred to intermediate transfer belt **421**.

Thereafter, when the sheet passes through the secondary transfer nip, the toner image on intermediate transfer belt **421** is secondary-transferred to the sheet. To be more specific, a secondary transfer bias is applied to secondary transfer roller **424**, and an electric charge opposite to that of the toner is applied to the rear side (the side that makes contact with secondary transfer roller **424**) of the sheet, whereby the toner image is electrostatically transferred to the sheet. The sheet on which the toner image has been transferred is conveyed toward fixing section **60**.

Belt cleaning device **426** includes a belt cleaning blade configured to make sliding contact with the surface of intermediate transfer belt **421**, and the like, and removes transfer residual toner remaining on the surface of intermediate transfer belt **421** after the secondary transfer.

Alternatively, in intermediate transfer unit **42**, it is also possible to adopt a configuration (so-called belt-type secondary transfer unit) in which a secondary transfer belt is installed in a stretched state in a loop form around a plurality of support rollers including a secondary transfer roller in place of secondary transfer roller **424**.

Fixing section **60** includes upper fixing section **61** having a fixing side member disposed on a fixing surface (the surface on which a toner image is formed) side of a sheet, lower fixing section **62** having a back side supporting member disposed on the rear surface (the surface opposite to the fixing surface) side of a sheet, heating source **63** configured to heat the fixing side member, pressure contact separation section **64** configured to bring the back side supporting member into pressure contact with the fixing side member, and the like.

For example, when upper fixing section **61** is of a roller heating type, the fixing roller serves as the fixing side member, and when upper fixing section **61** is of a belt heating type, the fixing belt serves as the fixing side member. In addition, for example, when lower fixing section **62** is of a roller pressing type, the pressure roller serves as the back side supporting member, and when lower fixing section **62** is of a belt pressing type, the pressing belt serves as the back side supporting member. The fixing side member and back side supporting member are also collectively called "fixing member."

FIG. **2** illustrates a configuration in which upper fixing section **61** is of a roller heating type, and lower fixing section **62** is of a roller pressing type. That is, in FIG. **4** described

later, fixing roller **611** is a fixing side member, and pressure roller **621** is a back side supporting member.

Upper fixing section **61** includes upper fixing section-driving section **612** for rotating the fixing side member. When control section **80** controls the operation of upper fixing section-driving section **612**, the fixing side member rotates (travels) at a predetermined speed. Lower fixing section **62** includes lower fixing section-driving section **622** for rotating the back side supporting member. When control section **80** controls the operation of the lower fixing section-driving section **622**, the back side supporting member rotates (travels) at a predetermined speed. It is to be noted that, in the case where the fixing side member follows the rotation of the back side supporting member, the upper fixing section-driving section **612** is not required.

Heating source **63** is disposed inside or near the fixing side member. When control section **80** controls the output of heating source **63**, the fixing side member is heated, and the fixing temperature is maintained at a predetermined temperature (for example, a fixable temperature, or a fixation idling temperature). On the basis of the detection result of a fixing temperature detection section (not illustrated) disposed at a position near the fixing side member, control section **80** controls the output of heating source **63**.

In addition, when control section **80** controls the operation of pressure contact separation section **64** such that the back side supporting member is brought into pressure contact with the fixing side member, a fixing nip for conveying a sheet in a tightly sandwiching manner is formed. A toner image is secondary-transferred, and heat and pressure are applied to a sheet which has been conveyed along a sheet feeding path, at the time when the sheet passes through the nip portion. Thus, the toner image is fixed to the sheet.

Sheet conveyance section **50** includes sheet feeding section **51**, sheet ejection section **52**, sheet feeding path section **53**, and the like.

Paper sheets (standard type sheets and special type sheets) discriminated on the basis of their weight, size and the like are stored on a predetermined type basis in respective three sheet tray units of sheet feeding section **51**.

Sheet feeding path section **53** includes a plurality of conveyance roller sections that include entry roller section **531**. Sheet feeding path section **53** conveys to image forming section **40** (secondary transfer section) a paper sheet fed from sheet feeding section **51** or a roll sheet fed from sheet feeding apparatus **1**A. Sheet feeding path section **53** is a part of sheet feeding path **93** of image forming apparatus **1**.

The roll sheet fed from sheet feeding apparatus **1**A is conveyed to image forming section **40** by sheet feeding path section **53**. Thereafter, a toner image on intermediate transfer belt **421** is secondary-transferred to a surface of the roll sheet at one time at the time when the roll sheet passes through transfer nip N_T, and then a fixing process is performed in fixing section **60**. The roll sheet on which an image has been formed is ejected out of the image forming apparatus by sheet ejection section **52** provided with a sheet discharging roller section **52***a* (see FIG. **4**) and the like, and then wound by roll winding section **92** of winding apparatus **1**C.

FIG. **4** is a side view illustrating a sheet feeding path that leads to roll winding section **92** through secondary transfer nip N_T and fixing nip N_F. FIG. **5** is a plan view illustrating a sheet feeding path that leads to roll winding section **92** through secondary transfer nip N_T and fixing nip N_F.

As illustrated in FIG. **4** and FIG. **5**, on the upstream side of fixing nip N_F in the sheet conveyance direction, pre-fixation guide members **931** are disposed along the sheet feeding path on both sides of the sheet feeding path in the sheet width direction. In FIG. **4** and FIG. **5**, pre-fixation guide members **931** are disposed to the sheet feeding path at a part that connects entry roller section **531** with secondary transfer nip N_T, and at a part that connects secondary transfer nip N_T with fixing nip N_F. It is to be noted that the disposition of pre-fixation guide members **931** (the number of pre-fixation guide members **931**, the positions where pre-fixation guide members **931** are disposed and the like) is not limited to the above-mentioned disposition.

Pre-fixation guide members **931** are each composed of a pair of guide plates facing each other in the sheet width direction. The pair of guide plates serving as pre-fixation guide member **931** are disposed symmetrically about the sheet-feeding center (the center of the sheet feeding path in the width direction). Preferably, pre-fixation guide member **931** has a low frictional property, and is a member in which fluororesin is provided on the surface that makes contact with a roll sheet, for example. The position of pre-fixation guide member **931** is set in advance such that the separation distance between the guide plates (hereinafter referred to as "guide width") matches the width of the roll sheet used for the image formation. Pre-fixation guide member **931** is fixed at such a position. Since a roll sheet is conveyed along pre-fixation guide member **931**, meandering of the roll sheet is not caused before the roll sheet enters fixing nip N_F, and the center of the roll sheet (the center of the roll sheet in the width direction) matches the sheet-feeding center.

On the downstream side of fixing nip N_F in the sheet conveyance direction, post-fixation guide members **932** are disposed along the sheet feeding path on both sides of the sheet feeding path in the sheet width direction. In FIG. **4** and FIG. **5**, post-fixation guide members **932** are disposed to the sheet feeding path at a part that connects fixing nip N_F with sheet ejection roller **52***a*, and at a part that connects pre-winding roller **936** with roll winding section **92** of winding device **1**C. It is to be noted that the disposition of post-fixation guide members **932** (the number of post-fixation guide members **932**, the positions where post-fixation guide members **932** are disposed and the like) is not limited to the above-mentioned disposition.

Post-fixation guide members **932** are each composed of a pair of guide plates facing each other in the sheet width direction. The pair of guide plates serving as post-fixation guide member **932** are disposed symmetrically about the sheet-feeding center. Preferably, post-fixation guide member **932** has a low frictional property as with pre-fixation guide member **931**. The position of post-fixation guide member **932** is set in advance such that the guide width matches the width of the roll sheet used for image formation in the initial state. In addition, post-fixation guide member **932** is connected with guide driving section **933** through a power transmission mechanism (not illustrated), and thus the guide width can be changed.

Preferably, post-fixation guide member **932** is disposed immediately after fixing section **60**. Such a configuration limits meandering of a roll sheet in image forming apparatus main body **1**B, and thus the winding quality of a roll sheet can be enhanced, and damage of a roll sheet and degradation of image quality in association with the meandering can be prevented.

In addition, post-fixation guide member **932** is preferably disposed on the downstream side of buffer section **937** described later in the sheet conveyance direction, that is, at a position immediately before roll winding section **92**. Such a configuration makes it possible to surely correct the position in the sheet width direction of a roll sheet which has

been sufficiently cooled down and thus has a fixed sheet width (a roll sheet after shrinkage or expansion), and consequently winding of the roll sheet can be performed in an orderly fashion without causing irregularity of the ends.

On the downstream side of fixing nip N_F in the sheet conveyance direction, and on the upstream side of post-fixation guide member **932** in the sheet conveyance direction (in FIG. **4** and FIG. **5**, immediately after fixation output roller **65**), sheet width detection sensor **934** (sheet width detection section) that detects the width of a roll sheet that has passed through fixing nip N_F is disposed. Sheet width detection sensor **934** is, for example, composed of a line sensor disposed in parallel with the sheet width direction. In a line sensor, the sensor output changes at end positions of a sheet as the boundaries, and therefore the positions where the changing points of the sensor output are found are the positions of the both end portions of the roll sheet in the width direction. The width of the roll sheet that has passed through fixing section **60** can be detected on the basis of the positions of the both end portions of the roll sheet.

During image formation, control section **80** controls guide driving section **933** to operate on the basis of detection results of sheet width detection sensor **934**, thereby adjusting the guide width of post-fixation guide member **932**. That is, the guide width of post-fixation guide member **932** is adjusted in accordance with the variation of the width of a roll sheet due to shrinkage or expansion. Also in this case, the symmetry of the pair of guide plates serving as post-fixation guide member **932** is maintained.

In principle, the guide width of post-fixation guide member **932** is adjusted such that the guide width matches the width of a roll sheet after shrinkage or expansion. However, in the case of an image formation on a tack roll sheet (a roll sheet having a surface base material, an adhesive and a release paper), when the post-fixation guide member **932** and the roll sheet excessively make sliding contact with each other, the adhesive may leak out from the end surfaces of the roll sheet in the width direction, thus contaminating the roll sheet and post-fixation guide member **932**. For this reason, when an image is formed on a tack roll sheet, it is possible to adjust the guide width to a value greater than the detected width of the roll sheet.

It is to be noted that the temperature of a tack roll sheet before the fixation process is lower than the temperature of the tack roll sheet that has passed through fixing section **60**, and the adhesive is not easily leaks out from the end surfaces of the roll sheet in the width direction, and therefore pre-fixation guide member **931** may be in sliding contact with the tack roll sheet.

Winding device **1**C includes, on the upstream side of roll winding section **92** in the sheet conveyance direction, buffer section **937** that gives a predetermined tensile force to a roll sheet. In FIG. **4** and FIG. **5**, buffer section **937** is provided between entrance roller **935** and pre-winding roller **936**.

Buffer section **937** includes tension roller **937***a* that can move vertically, for example. When tension roller **937***a* moves vertically, slackening of a roll sheet is reduced, and a proper tensile force is given to the roll sheet.

FIG. **6** is a flowchart illustrating an exemplary guide width adjustment process. This process is achieved when CPU **81** of image forming apparatus main body **1**B executes a predetermined program stored in ROM **82** upon the turning on of the power of image forming apparatus **1**, for example.

It is assumed that a winding quality priority mode or an adhesive adhesion prevention priority mode is set in advance at the time of the start of image formation. A user can set desired modes by operating operation display section **20**.

At step S**101** of FIG. **6**, control section **80** determines whether a printing job has been received. When a printing job has been received ("YES" at step S**101**), the process is advanced to step S**102**.

At step S**102**, control section **80** acquires detection results (the width of a roll sheet after shrinkage or expansion) of the sheet width detection sensor.

At step S**103**, control section **80** determines whether the roll sheet in use for the image formation is a tack roll sheet. The sheet type information of the roll sheet in use for the image formation is included in the printing job, for example. When a tack roll sheet is in use for the image formation (at step S**103** "YES"), the process is advanced to step S**104**. When a roll sheet other than a tack roll sheet is in use for the image formation (at step S**103** "NO"), the process is advanced to step S**106**.

At step S**104**, control section **80** determines whether the priority mode is set to the winding quality priority mode or the adhesive adhesion prevention priority mode. When the winding quality priority mode is set, the process is advanced to step S**106**. When the adhesive adhesion prevention priority mode is set, the process is advanced to step S**105**.

At step S**105**, control section **80** controls the operation of guide driving section **933** to adjust the guide width of post-fixation guide member **932**. At this time, control section **80** adjusts the guide width to a value slightly greater than the width of the roll sheet acquired at step S**102**. Such a configuration makes it possible to limit an excessive sliding contact between post-fixation guide member **932** and the roll sheet, and therefore it is possible to prevent a situation where the roll sheet and post-fixation guide member **932** are contaminated and damaged by adhesive leaked out from the end surfaces of the roll sheet in the width direction.

At step S**106**, control section **80** adjusts the position of post-fixation guide member **932** such that the width of the roll sheet acquired at step S**102** matches the guide width. With such a configuration, the roll sheet is conveyed along post-fixation guide member **932** in the state where the sheet-feeding center matches the sheet center even when the roll sheet shrinks or expands due to the fixation process, and thus the winding quality is remarkably enhanced.

It is to be noted that when a tack roll sheet is used, the winding quality can be enhanced although the effect of preventing leakage of adhesive from the end surfaces of the roll sheet in the width direction decreases.

At step S**107**, control section **80** determines whether the series of the image formation processes have been terminated. The series of image formation processes are processes for forming an image based on a signal requesting image formation (for example, printing job). When the series of the image formation processes have been terminated ("YES" at step S**107**), the guide width adjustment process is terminated. When the series of the image formation processes have not been terminated ("NO" at step S**107**), the processes subsequent to step S**102** are repeated.

As described, image forming apparatus **1** includes: a sheet feeding section (roll sheet feeding section **91**) configured to feed a roll sheet; a sheet feeding path (**93**) along which a roll sheet fed from the sheet feeding section is conveyed; an image forming section (**40**) configured to transfer a toner image to a roll sheet conveyed along the sheet feeding path; a fixing section (**60**) configured to fix the toner image by applying heat and pressure to a roll sheet on which the toner image is transferred at a fixing nip (N_F); a winding section (roll winding section **92**) configured to wind up a roll sheet

on which the toner image is fixed; a guide member (post-fixation guide member **932**) disposed along the sheet feeding path on both sides in a sheet width direction and on a downstream side of the fixing nip in a sheet conveyance direction; and a guide adjusting section (control section **80** and guide driving section **933**) configured to adjust a guide width of the guide member in accordance with an amount of shrinkage or an amount of expansion of a roll sheet passed through the fixing nip.

To be more specific, image forming apparatus **1** includes a sheet width detection section (sheet width detection sensor **934**) disposed between fixing nip (N_F) and the guide member (post-fixation guide member **932**), and configured to detect a sheet width of a roll sheet passed through the fixing nip and the guide adjusting section (control section **80** and guide driving section **933**) adjusts the guide width of the guide member on a basis of a detection result obtained by the sheet width detection section.

With image forming apparatus **1**, the guide width of post-fixation guide member **932** is adjusted in accordance with the sheet width of a roll sheet shrunken or expanded by the fixation process, and thus meandering and deformation of a roll sheet after the fixation can be surely prevented. Consequently, winding of a roll sheet can be performed in an orderly fashion without causing irregularity of ends.

In addition, image forming apparatus **1** has a first priority mode (winding quality priority mode) and a second priority mode (adhesive adhesion prevention priority mode) for a case where a tack roll sheet is used for image formation, the first priority mode being configured to enhance winding quality, the second priority mode being configured to prevent adhesion of adhesive of the tack roll sheet to the guide member (post-fixation guide member **932**). The guide adjusting section (control section **80** and guide driving section **933**) selects one of the first priority mode and the second priority mode, and the guide adjusting section sets a guide width of the guide member to a value equal to a width of a roll sheet passed through the fixing nip when the first priority mode is selected, whereas the guide adjusting section sets the guide width of the guide member to a value greater than the width of the roll sheet passed through the fixing nip when the second priority mode is selected.

With such a configuration, in accordance with whether the user prioritizes the winding quality or prevention of adhesion of the adhesive, the guide width of post-fixation guide member **932** can be appropriately adjusted.

It is to be noted that, when a tack roll sheet is used for image formation, it is also possible to set the guide width of post-fixation guide member **932** such that the guide width is always greater than the sheet width detected by the sheet width detection section (sheet width detection sensor **934**).

While the invention made by the present inventor has been specifically described based on the preferred embodiments, it is not intended to limit the present invention to the above-mentioned preferred embodiments but the present invention may be further modified within the scope and spirit of the invention defined by the appended claims.

For example, the guide adjusting section (control section **80** and guide driving section **933**) may adjust the guide width of guide member (post-fixation guide member **932**) on the basis of guide width data set in advance in accordance with the sheet type of the roll sheet and elapsed from the start of feeding of the sheet. The guide width data is stored in storage section **72** for example. In this case, the guide width of the guide member corresponding to the time from the start of feeding of the sheet may be set by the user by operating operation display section **20**.

In addition, for example, it is also possible to use a biasing member such as a compression spring to press the guide member (post-fixation guide member **932**) against the end surfaces of a roll sheet in the width direction with a small pressure force which does not cause deformation of the roll sheet, such that the guide member moves in accordance with the variation of the width of the roll sheet. In this case, the biasing member serves as the guide adjusting section of the embodiment of the present invention.

The embodiment disclosed herein is merely an exemplification and should not be considered as limitative. The scope of the present invention is specified by the following claims, not by the above-mentioned description.

It should be understood that various modifications, combinations, sub-combinations and alterations may occur depending on design requirements and other factors in so far as they are within the scope of the appended claims or the equivalents thereof.

What is claimed is:

1. An image forming apparatus comprising:

a sheet feeding section configured to feed a roll sheet;

a sheet feeding path along which a roll sheet fed from the sheet feeding section is conveyed;

an image forming section configured to transfer a toner image to a roll sheet conveyed along the sheet feeding path;

a fixing section configured to fix the toner image by applying heat and pressure to a roll sheet on which the toner image is transferred at a fixing nip;

a winding section configured to wind up a roll sheet on which the toner image is fixed;

a guide member disposed along the sheet feeding path on both sides in a sheet width direction and on a downstream side of the fixing nip in a sheet conveyance direction;

a guide adjusting section configured to adjust a guide width of the guide member in accordance with an amount of shrinkage or an amount of expansion of a roll sheet passed through the fixing nip; and

a sheet width detection section disposed between the fixing nip and the guide member, and configured to detect a sheet width of a roll sheet passed through the fixing nip, wherein the guide adjusting section adjusts the guide width of the guide member on a basis of a detection result obtained by the sheet width detection section, wherein:

the image forming apparatus has a first priority mode and a second priority mode for a case where a tack roll sheet is used for image formation, the first priority mode being configured to enhance winding quality, the second priority mode being configured to prevent adhesion of adhesive of the tack roll sheet to the guide member; and

the guide adjusting section selects one of the first priority mode and the second priority mode, and the guide adjusting section sets the guide width of the guide member to a value equal to a width of a roll sheet passed through the fixing nip when the first priority mode is selected, whereas the guide adjusting section sets the guide width of the guide member to a value greater than the width of the roll sheet passed through the fixing nip when the second priority mode is selected.

2. The image forming apparatus according to claim **1**, further comprising an operation section for setting the priority modes in advance.

3. The image forming apparatus according to claim 1, further comprising a buffer section disposed between the fixing nip and the winding section, and configured to give a predetermined tensile force to a roll sheet, wherein

the guide member is disposed at least between the buffer section and the winding section.

4. The image forming apparatus according to claim 1, wherein the guide width of the guide member matches the sheet width of the roll sheet in an initial state before the guide width is adjusted.

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